Service Date: May 26, 1998

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

* * * * *

IN THE MATTER of the Investigation	)	UTILITY DIVISION
of the Commission Implementation of a	)	**DOCKET NO. D97.9.167**
Forward Looking Universal Service	)	
Cost Model.	)	**ORDER NO. 6015b**

<u>FINAL ORDER</u>

<u>APPEARANCES</u>

<u>FOR U S WEST COMMUNICATIONS, INC.</u>:

John Alke, Attorney at Law, Hughes, Kellner, Sullivan & Alke, 40 West Lawrence, Helena, Montana 59601

Robert L. Dietz, Attorney at Law, Perkins & Coie, 607 14th Street Northwest, Washington, DC 20005-2011

Andrew D. Crain, Attorney at Law, U S WEST, Inc., 1801 California Street, Suite 5100, Denver, Colorado 80202

<u>FOR AT&T COMMUNICATIONS</u>:

Richard S. Wolters, Attorney at Law, AT&T, 1875 Lawrence Street, Room 1575, Denver, Colorado 80202

<u>FOR MONTANA INDEPENDENT TELECOMMUNICATIONS SYSTEMS</u>:

Michael Strand, Attorney at Law, 2021 11th Avenue, Suite 12, Helena, Montana 59601

<u>FOR MONTANA TELEPHONE ASSOCIATION</u>:

William Squires, Attorney at Law, Box 2166, Great Falls, Montana 59403

<u>FOR MONTANA CONSUMER COUNSEL</u>:

Mary Wright, Staff Counsel, Montana Consumer Counsel, 616 Helena Avenue, PO Box 201703, Helena, Montana 59620-1703

<u>BEFORE</u>:

       DAVE FISHER, Chairman
       NANCY MCCAFFREE, Vice Chair
       DANNY OBERG, Commissioner
       BOB ROWE, Commissioner

<u>COMMISSION STAFF</u>:

       Karen Hammel, Staff Attorney
       Mike Lee, Economics and Rate Design Bureau Chief
       Scott Fabel and Wendy Fuller, Rate Analysts

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I. BACKGROUND

A.   Introduction

1.   On May 8, 1997, the Federal Communications Commission (FCC) released a Report and Order in CC Docket No. 96-45 (Universal Service Order) pursuant to § 254 of the Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (Feb. 8, 1996) (the "1996 Act"). The FCC's Universal Service Order requested that states elect by August 15, 1997, whether they would conduct their own forward-looking economic cost studies for the purpose of determining federal universal service support for non-rural eligible carriers. The Montana Public Service Commission (Commission) initiated this Docket in September 1997 to determine an appropriate cost model for federal universal service purposes, after notifying the FCC prior to the deadline that it intended to choose its own cost model rather than adopt the FCC's model. The original deadline for states to submit a cost model to the FCC was February 6, 1998; the FCC extended this deadline to April 24, 1998, and subsequently extended it again to May 26, 1998.

2.   Intervention was granted to the following: U S WEST Communications, Inc. (U S WEST), AT&T Communications of the Mountain States, Inc. (AT&T), MCI Telecommunications Corp. (MCI), Sprint Communications Company L.P., the Montana Telephone Association (MTA), Montana Independent Telecommunications Systems (MITS), Ronan Telephone Company, Hot Springs Telephone Company, Citizens Telecommunications Company of Montana, and the Montana Consumer Counsel.

3.   U S WEST submitted one of the two proposed proxy cost models presented to the Commission. U S WEST's model is the Benchmark Cost Proxy Model (BCPM). AT&T and

MCI jointly filed the Hatfield model. Both models underwent numerous changes and upgrades;

the final models considered were the BCPM 3.1 and the HAI 5.0a.[1]

4.   The Commission conducted a hearing on March 10-11, 1998. Witnesses for U S

WEST, AT&T and MCI pre-filed testimony and were available for cross-examination. No other

parties presented witnesses.

B.   The Telecommunications Act of 1996

5.   The 1996 Act amends the Communications Act of 1934, 47 U.S.C. §§ 151 *et seq.*

In the 1996 Act, Congress directed the FCC and states to establish support mechanisms "to

ensure the delivery of affordable telecommunications service to all Americans, including low-

income consumers, eligible schools and libraries, and rural health care providers." Universal

Service Order, ¶ 1. Specifically, the Congress directed the FCC and states to devise methods to

ensure that

> [c]onsumers in all regions of the Nation, including low-income consumers and
>
> those in rural, insular, and high cost areas . . . have access to telecommunications
>
> and information services, including interexchange services and advanced
>
> telecommunications and information services, that are reasonably comparable to

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[1]The HAI 5.0a survived through numerous revisions known as the Hatfield model; the name was changed with the final revision.

those services provided in urban areas and that are available at rates that are

reasonably comparable to rates charged for similar services in urban areas.

6.   Congress further directed the FCC to institute and refer to a Federal-State Joint

Board under 47 U.S.C. § 410(c) a proceeding to recommend changes to any of the FCC's

regulations in order to implement 47 U.S.C. §§ 214(e) and 254, including a definition of services

to be supported by federal universal service support. 47 U.S.C. § 254(a)(1). The Joint Board

was required to make its recommendations to the FCC nine months after the date of enactment of

the 1996 Act.

7.   The Joint Board issued a Recommended Decision as required by the 1996 Act on

November 8, 1996. *See* In the Matter of Federal-State Board on Universal Service,

Recommended Decision, CC Docket No. 96-45, 12 F.C.C.R. 87 (1996). Congress further

required that the FCC initiate a single proceeding to implement the Joint Board recommendations

and complete its proceeding within 15 months of the effective date of the 1996 Act. Congress

required the FCC to adopt rules in the universal service proceeding, including a definition of the

services that are supported by the federal universal service support mechanisms and to adopt a

specific timetable for implementation. 47 U.S.C. § 254(a)(2).

C.   The FCC Universal Service Order

8.   The FCC issued its Universal Service Order on May 8, 1997. In the Universal

Service Order the FCC adopted a principle recommended by the Joint Board in addition to the

six principles prescribed by Congress in § 254(b) of the 1996 Act for the "protection of the

public interest, convenience, and necessity." Consistent with the Joint Board's recommendation,

the FCC adopted the principles identified in § 254(b) and the additional principle of competitive

neutrality. *See* Universal Service Order, at ¶ 43. The principle of competitive neutrality includes

technological neutrality. Id. at ¶ 49.

9.   In the Universal Service Order, the FCC also defines "universal service" and what

services are to be supported. *See* Id., at ¶¶ 56-87. The FCC also addressed eligible carrier

designation, high cost support, support for low-income consumers, subscriber line charges,

carrier common line charges, administration of support mechanisms, and support for schools,

libraries and health care providers. The FCC expressly did not establish a nationwide

affordability rate because "a nationwide rate would ignore the vast differences within and among

regions that can affect what constitutes affordable service." Universal Service Order, at ¶ 111.

10.   The FCC's Universal Service Order prescribes the following ten criteria which a

state-conducted study must meet in order to be approved for use in calculating federal universal

service support:

>   1.   The technology assumed in the study or model must be the least-
> cost, most-efficient, and reasonable technology for providing the supported
> services that is currently being deployed. The model must include the incumbent
> local exchange companies' (ILECs) wire centers as the center of the loop network;
> the outside plant should terminate at the ILECs' current wire centers. The loop
> design should not impede the provision of advanced services. Wire center line
> counts should equal actual ILEC wire center line counts. Average loop length
> should reflect the ILECs' actual average loop length.

>   2.   Any network function or element, such as loop, switching,
> transport, or signaling, necessary to produce supported services must have an
> associated cost.

>   3.   Only long-run, forward-looking economic costs may be included.
> The long-run period must be long enough that all costs may be treated as variable
> and avoidable. The costs must not be the embedded cost of the facilities,
> functions, or elements. The study or model must be based on an examination of
> the current cost of purchasing facilities and equipment rather than list prices.

4.   The rate of return must be either the authorized federal rate of return on interstate services, currently 11.25%, or the state's prescribed rate of return for intrastate services.

5.   Economic lives and future net salvage percentages used in calculating depreciation expense must be within the FCC-authorized range.

6.   The cost study or model must estimate the cost of providing service for all businesses and households within a geographic area, including the provision of multi-line business services, special access, private lines, and multiple residential lines.

7.   A reasonable allocation of joint and common costs must be assigned to the cost of supported services.

8.   The cost study or model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment. All underlying data should be verifiable, engineering assumptions reasonable, and outputs plausible.

9.   The cost study or model must include the capability to examine and modify the critical assumptions and engineering principles.

10.   The cost study or model must deaverage support calculations to the wire center serving area level at least and, if feasible, to even smaller areas such as Census Block Group, Census Block, or grid cell.

D.   Senate Bill 89 Enacted by the 1997 Montana Legislature

11.   The FCC also stated that the cost model must be the same model that is used by

the state to determine intrastate universal service support levels pursuant to § 254(f) of the 1996

Act. The 1997 Montana Legislature passed Senate Bill 89, codified in Title 69 of the Montana

Code Annotated. *See* 1997 Mont. Laws 1621. Sections 69-3-845(6) and (7), MCA (1997),

provide that if the Commission chooses a cost proxy model for non-rural companies and rural

companies that elect to use the model pursuant to § 69-3-845, MCA, it must use a model that:

(a)   targets support to a geographic area smaller than a wire center;
(b)   uses acceptable outside plant design and costing principles;

     (c)   uses reasonable switch design and costing principles;

     (d)   includes a reasonable share of the joint and common costs of the telecommunications carrier;

     (e)   meets standards for documenting model logic and the sources of cost data input; and

     (f)   meets reasonableness tests to ensure that model outputs are representative of costs that can be reasonably expected in the construction of a network and that the network is capable of providing telecommunications services that meet the telecommunications services quality standards of the commission and federal regulators.

The FCC's Universal Service Order allows rural carriers to use embedded costs until it determines that forward looking economic cost mechanisms account reasonably for the cost difference in rural study areas. Section 69-3-845, MCA, does not conflict with this.

12.   On February 27, 1998, the FCC released a Public Notice setting forth the information it needs to determine whether a state's cost study complies with the ten criteria listed above and the format in which this information should be presented. This information is formatted according to the FCC's direction and included in appendices to this Order.

II.   PROXY COST MODELS

A.   Model Choices

13.   The Montana Commission had two initial choices in selecting the method by which universal service funding levels would be determined. The Commission could (1) choose a proxy cost model and recommend its use for the State of Montana, or (2) elect not to choose a model, with the consequence that the FCC would then pick the model and its inputs for federal funding of universal service for Montana. The FCC would then estimate the federal universal service fund costs for Montana's non-rural carrier, U S WEST. In August 1997 the Commission

notified the FCC of its intention to choose a proxy cost model and recommend its use for

Montana, and subsequently opened this Docket for that purpose.

14.   If after its evaluation the FCC accepts Montana's recommended forward looking

economic cost model, the FCC will use that model to develop, in part, the universal service

funding level for U S WEST, Montana's non-rural carrier. If Montana's recommendation is not

accepted, the FCC will determine the cost to provide universal service funding according to its

forward-looking economic cost methodology.   At this time, the FCC has committed to fund only

25 percent of the total universal service funding required by a state, regardless of the model

selected. The FCC is presently reconsidering its decision to fund 25 percent of the total universal

service funding.

15.   The Montana Commission was presented two models for consideration in this

docket. The Benchmark Cost Proxy Model (BCPM) 2.5, jointly sponsored by U S WEST,

Sprint, Indetec, and Pacific Bell, was presented to the Commission by U S WEST on

December 24, 1997. Version BCPM 3.1, using Montana specific data, was subsequently

submitted on January 27, 1998. The Hatfield Model 5.0 (now called the HAI Model), sponsored

by AT&T and MCI, was presented to the Commission on December 31, 1997 by AT&T.

Subsequently, version 5.0a was submitted on February 13, 1998. **The FCC has reviewed both**

models in CC Docket No. 96-45.

16.   Proxy cost models, such as the BCPM and HAI, are designed to estimate the

incremental costs of telecommunications providers without representing the costs of any

particular provider.   Costs are estimated using forward-looking technology, long and short run

costs, and economic costs rather than accounting costs. This means that estimates should not

reflect embedded technologies and costs. Hutsell Direct, pp. 6-8. Both proxy cost models

submitted incorporate certain characteristics required by the FCC. These characteristics are

discussed in more detail in the model criteria section of this order.

17. The proxy cost models submitted are designed to estimate costs of providing

service to geographically specific areas in order to identify high cost areas. Once high cost areas

are known, universal support levels can be estimated. This high level of geographic

disaggregation allows universal support funding to be appropriately directed to high cost areas.

Implicit cross subsidies that have traditionally supported the universal service ideal can thereby

be made explicit. Hayhurst Direct, p. 2. This allows high cost areas to maintain service and

affordability as competition moves rates toward true costs.

18. Although the recommended proxy cost model initially impacts the level of the

federal universal service funding for Montana's non-rural carrier, this choice has a secondary

effect. This choice obligates the Commission to use the same model for any state universal

service fund.

19. The BCPM and HAI have many common features, largely due to the requirements

for a proper proxy cost model put forth by the FCC (discussed below). For example, both

models build a hypothetical telecommunications network that provides basic voice-grade service

with access to advanced services. They are to use forward-looking technology in a competitively

neutral manner to estimate the support needed to provide affordable service in high-cost areas.

20. In addition, both models assume all plant is placed at a single point in time, as if

the entire region is a new service area--the so-called scorched node approach. Although it is

assumed that there is no existing plant, proxy cost models also assume that plant will have to be

placed through existing neighborhoods, including sidewalks, roads, and fences. Copeland Direct,

p. 27. These assumptions result in cost estimates to build plant in existing conditions using

current technologies.

21.   **Both models also use residential census data, business data, terrain**

information, and approximately one thousand inputs in designing their networks. The

models rely heavily on preprocessing functions to construct major inputs into the model,

including determining customer location and developing population groupings. In

addition, both models organize plant characteristics into nine density groups, which are

based on population and terrain characteristics. Copeland Direct, p. 5.

22.   Although both the BCPM and HAI are designed to estimate incremental costs of

providing service to all areas, there are significant differences in their methodologies,

assumptions, algorithms, and **input values**.   Their outputs differ markedly as a result. In order

to better show these differences, a brief outline is provided below of each model, its history,

methodologies, default input sources, and outputs for Montana.

B.   <u>Benchmark Cost Proxy Model (BCPM)</u>

23.   **Mr. Peter Copeland presented the BCPM 3.1 on behalf of U S WEST. He**

testified that the BCPM has evolved considerably since its beginnings. It has undergone

extensive review and revision that reflects FCC requirements, criticism by competitors,

and/or suggestions made by the model sponsors.   The BCPM estimates universal service

funding requirements to provide affordable basic local service to high-cost areas.

Copeland Direct, p. 3. It applies a uniform methodology and generic forward-looking

technology to a hypothetical network for discrete geographic areas. This allows universal

service funds to be targeted to specific high-cost areas.

24.   The BCPM estimates costs using a series of modules. These modules

represent the various sub-systems pertinent to the design and costing of a forward looking

telecommunications network. These modules include a preprocessor, outside plant, switch,

transport, signaling, capital cost, operating expense, and report. Copeland Supplemental,

Exhibit PBC-10, p. 20.

25.   An important feature of the BCPM 3.1 is the customer location methodology

in the Preprocessor Module. The Preprocessor Module formats raw input data for use by

the BCPM. It identifies customer locations within wire centers and builds a grid system

that estimates costs to a smaller than wire center area. It also designs the feeder plant

routes used to create the distribution cable system. Copeland Supplemental, Exhibit PBC-

10, p. 20.

26.   Copeland explained how the BCPM locates its customers.   It uses census

data at the census block level and wire center boundaries provided by Business Location

Research to determine customer location. Copeland Direct, p. 18. Wire centers are

overlaid with microgrids, $1/200^{th}$ of a degree latitude and longitude in size. These grids are

then aggregated based on cost characteristics (using terrain characteristics), line counts,

and engineering constraints of Carrier Serving Areas and Distribution Areas. Copeland

called the resulting dynamic grids ultimate grids.[2] Copeland Direct, p. 20. The household

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[2]These grids are dynamic in the sense that their size and shape are not predetermined but
vary in size depending on terrain, customer density, and engineering constraints.

and business line count of the composite ultimate grids equals the sum of the household

and business lines for the associated underlying microgrids. Copeland divided the ultimate

grids into quadrants, based on the road centroid of the grid. He discarded empty

quadrants and estimated the road area within 500 feet of roads in each quadrant, thereby

establishing a square distribution area equal to the total area estimated. Copeland Direct,

p. 22. The households within the grid are then equally distributed throughout the

estimated area and plant is built to these locations.

27.   The Outside Plant Module designs and costs the distribution cable system.

Copeland Supplemental, Exhibit PBC-10, p. 20. Plant costs are estimated assuming a

maximum loop length for each Carrier Service Area less than 12,000 feet, and ultimate grid

size is usually restricted to a maximum size of approximately 1/25th of a degree latitude and

longitude.[3] Copeland Supplemental, Exhibit PBC-10, p. 27. Main feeder radiates from the

wire center on direct north, east, south, and west axes for 10,000 feet. Feeder then is

directed toward population centers. Internal tests ensure that the least cost network is

built. Copeland Supplemental, Exhibit PBC-10, p. 36. Subfeeder routes are then designed.

 Where appropriate, subfeeder is shared by more than one ultimate grid. The equipment

used, including cable type, is determined by engineering constraints and by density group.

Copeland Supplemental, Exhibit PBC-10, p. 40.   Each quadrant of an ultimate grid

represents a potential Distribution Area. Distribution quadrant customer data are then

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[3] ⠠⠍⠽⠽⠎⠭⠕⠍⠎⠏⠇⠇⠙⠒ ⠷⠏⠇⠭⠊⠕⠎⠬ ⠽⠕⠭⠹⠄ ⠑⠭⠍⠑⠍⠑⠙ ⠞⠩
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put into the distribution algorithms for cable design, maintaining engineering constraints. In addition, the model allows the user to cap the maximum loop investment. This cap allows less expensive technologies to substitute for traditional phone service.[4] Copeland Supplemental, Exhibit PBC-10, p. 47.

28.   The Switch Module designs and costs the digital host, remote, and stand alone switches based on the actual in-place network. Copeland Supplemental, Exhibit PBC-10, p. 20.   The BCPM 3.1 includes many improvements in this model over previous versions. It more accurately identifies the portions of investment that supports universal service by calculating switching investments in several switch functional categories. Inputs can be entered at a state-wide or wire center level. Copeland Supplemental, p. 3.

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[4] The investment cap does not assume that there exists a more cost effective method of servicing extremely long loops. Rather the assumption is that there is a point at which cost will exceed benefit in providing basic service. Hutsell Direct, p. 12.

29.   The Transport Module designs and costs the SONET interoffice transport

system.[5] Copeland Supplemental, Exhibit PBC-10, p. 20.   Forward-looking transport costs

are developed using information on existing interoffice traffic routing relationships

between switches. Individual switches on a SONET ring can have costs assigned to them

based on their unique characteristics. Copeland Supplemental, Exhibit PBC-10, p. 67.

Monthly costs for transport by exchange are determined.

30.   The Signaling Module designs and costs a modern SS7 signaling system.

Copeland Supplemental, Exhibit PBC-10, p. 20. The Signaling Cost Proxy Module

provides a table of inputs for signaling investments for residence and business lines for

small, medium and large companies. This is a new feature in BCPM 3.1. Previous versions

of BCPM included signaling costs in the switch investment module. Copeland

Supplemental, Exhibit PBC-10, p. 76.

31.   The Capital Costs Module develops depreciation, rate of return, and tax

factors and applies them to the investment accounts to produce the capital cost. Copeland

Supplemental, Exhibit PBC-10, p. 20. The model allows different economic lives, salvage

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[5]Synchronous optical network (SONET) is a set of standards for fiber optic transmission
and is an example of a forward-looking technology used by the models.

values, costs of removal, tax lives, and survival curves to be applied to the major accounts separately. Copeland Supplemental, Exhibit PBC-10, p. 80.

32. **The Operating Expense Module determines the annual costs of providing universal service. Copeland Supplemental, Exhibit PBC-10, p. 20. For the most part simple multipliers are applied to investment estimations to determine expense per dollar of investment or expense per access line amounts.[6] Copeland Supplemental, Exhibit PBC-10, p. 82.**

33. **The Reports Module summarizes the results of the previous modules. Copeland Supplemental, Exhibit PBC-10, p. 20. Monthly costs are estimated by combining operating expenses with costing factors. The funding necessary to provide universal service support to high cost areas is then estimated given user defined benchmarks. The results are available at the grid, wire center, company, or state level. Copeland Supplemental,** Exhibit PBC-10, p. 84.

34. The default inputs in BCPM 3.1 **represent an industry-wide composite of current material, installation, and structure prices developed by the joint sponsors of BCPM.[7] Copeland Supplemental, Exhibit PBC-10, p. 20. However, most of the inputs used in its calculations of universal support funding levels necessary for Montana are state specific. U S WEST changed input values in three general input areas in order to more accurately reflect U S WEST network construction costs in Montana. These input values**

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[6] Access line refers to a communication path between a switch and one end-user.

[7] Values are based on an industry-wide survey. Questionnaires were sent to U S WEST, Bell South, Nynex, GTEC, Bell Atlantic, Ameritech, Sprint, Pacific Bell, Southwestern Bell, and PTI. Copeland Direct, Exhibit PBC-2.

include (1) material and structure costs, (2) operational expense, and (3) capital cost and

depreciation factors.   Copeland, Direct, p. 33.

35.   Copeland's supplemental testimony **reports a total state average basic service**

per line cost of $64.67, and a total U S WEST (non-rural) basic service per line cost of

$44.08. Copeland's supplemental exhibit PBC-8 shows a maximum statewide universal

service fund of $175,349,712[8], and a U S WEST (non-rural) universal service fund level of

$54,054,045. At present, twenty-five percent of this fund will be funded at the federal level.

 The remaining portion must derive from a Montana universal service fund. Copeland

Supplemental, Exhibit PBC-8, pp. 3-6.

C.   Hatfield Model (HAI)

36.   A summary of the history, methodologies, default input sources, and outputs for

Montana are provided below.

37.   Mr. Brian Pitkin of AT&T gave a brief history of the HAI. Pitkin Direct, p. 5.

Seven versions of the HAI have been released since September 1996. Lent Rebuttal, p. 2. Pitkin

explained that the HAI has evolved through many versions in response to FCC direction, input

from state commission staffs, and ILEC criticism. It was originally designed to estimate TSLRIC

costs only, but then evolved to include loop investment data. Pitkin Direct, p. 5.   He asserts its

methods are consistent with TELRIC principles and it estimates costs that are efficient and

forward-looking.[9] Pitkin Direct, p. 7.

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[8] This total is calculated by adding residential and business aggregate support data results
reported in Exhibit PBC-8 in Copeland's supplemental testimony using a $30 high-cost
benchmark for residential lines and a $55 high-cost benchmark for business lines.

[9] Total Element Long Run Incremental Cost, or TELRIC, models are designed to cost

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unbundled network elements. In <u>Implementation of the Local Competition Provisions in the</u> <u>Telecommunications Act of 1996</u>, First Report and Order, FCC 96-325 (released Aug. 8, 1996), the FCC put forth necessary principles for a proper TELRIC model. This includes using forward-looking technology and economic costs. The FCC's assertion of jurisdiction to mandate TELRIC pricing for unbundled network elements was challenged and pricing rules were vacated in <u>Iowa Utils. Bd., et al. v. FCC</u>, 120 F.3rd 793 (8th Cir., 1997), *amended on reh'g,* 135 F.3d 535 (Oct. 14, 1997), *cert. granted, sub nom.* <u>AT&T Corp. v. Iowa Utils. Bd.</u>, 118 S.Ct. 683 (1998).

38.   The HAI model incorporates several functional modules. These include

distribution, feeder, switching and interoffice transmission, and expense modules. Pitkin

Supplemental, Exhibit BFP-6, pp. 20-23. They are used in conjunction with input databases to

estimate costs. Each module produces viewable work files, which in turn are used by other

modules as an input file. The expense module produces the final outputs of the model.   Pitkin

Direct, p. 32.

39.   Pitkin describes a key feature of the HAI module— its customer location and

terrain input database. **Pitkin Supplemental,** Exhibit BFP-6, p. 18. The input database is

formed outside of the model and corresponds to the preprocessing module in the BCPM 3.1.

Several data sources are used to locate actual customers to the greatest extent possible. HAI uses

line counts, wire center information, Census Block information, and geocoding to locate

households and businesses. Geocoding is a process where households are located using mailing

address databases. The number of geocoded locations must equal the target total line counts for

each Census Block. Households cannot be geocoded accurately, mostly due to the use of post

office boxes or rural route addresses. They are distributed uniformly along the Census Block

boundary, as these boundaries tend to fall along roads. Pitkin Direct, pp. 33-40.

40.   Once the process of determining customer location is complete, customers are

associated with a wire center. Households are then grouped into clusters based on the wire center

boundaries and efficient engineering standards. In order to assure high quality service, no point

in a cluster may be more than 18,000 feet from the cluster's centroid. Pitkin **Supplemental,**

Exhibit BFP-6, p. 31. In addition, no cluster can exceed 1,800 lines and no point in a cluster may

be more than two miles from its nearest neighbor. Clusters with five or more customers are

designated as main clusters. Outlier clusters, those with fewer than five customers, are

associated with a nearby main cluster for distribution purposes.

41.   Using the information created in its customer location and terrain database, HAI

builds a hypothetical plant network in its distribution module. It calculates distribution and

feeder distances, equipment necessary to meet demand, and investment associated with these

elements. Investment elements include distribution and drop cable, structures, and terminals and

splices. This module estimates the costs of building plant from Service Area Interfaces (SAIs) to

the customers' premises. Pitkin **Supplemental,** Exhibit BFP-6, p. 20.

42.   The HAI feeder module estimates costs to extend the network from the SAIs to

the wire center.   It estimates the equipment investment necessary to service the plant created in

the distribution module. Users have the option of having HAI "steer" the feeder routes towards

main population clusters. Pitkin **Supplemental,** Exhibit BFP-6, p. 21.

43   The HAI uses the switching and interoffice module to compute investments for

end office switching, tandem switching, signaling, and interoffice transmission facilities. It uses

wire center information to apply SONET and point-to-point technology. Users are able to

designate specific wire center locations for the different switches, and to specify inputs for per

line investments. **Pitkin Supplemental,** Exhibit BFP-6, p. 22.

44   Based on the level of geographic granularity the user chooses, the HAI contains

four different Expense modules. Users can choose to have monthly costs displayed by density

group, wire center, Census Group Block, or customer cluster.   Costs are estimated for network

maintenance and operations, taxes and variable overhead expenses, as well as for depreciation,

return on the debt and equity investment, and income taxes on equity return. Costs for

unbundled network elements, universal service, and carrier access and network interconnection

are all estimated. **Pitkin Supplemental,** Exhibit BFP-6, p. 22. The final outputs of the model

are generated in the expense modules.

45   Like the BCPM, the HAI estimates the costs of building and operating a

hypothetical network. The outputs produced by the HAI, however, not only determine costs for

basic universal service, but also determine costs for unbundled network elements and network

interconnection. Pitkin and other AT&T witnesses maintained that the ability of HAI to cost

unbundled network elements and network interconnection is a key difference between the two

models presented. Pitkin Direct, p. 29.

46   Default values in the HAI are based on publicly-available documentation, where

available, and on the opinions of subject matter experts and HAI personnel. Full rationale and

support for each default value was submitted with the model. A few of the input values were

modified for Montana. In order to reflect relatively inexpensive labor costs in Montana a labor

factor of 0.85 was used.   The HAI 5.0a also used FCC-prescribed depreciation lives and salvage

values. Pitkin Direct, p. 55. Otherwise, default inputs were used.

47   **The reported results of HAI 5.0a filed with Pitkin's supplemental testimony**

show a state average basic service per line cost of $24.49. This results in a statewide

universal service fund of $27,167,566 if all lines are supported.[10] Costs for non-rural

companies were not specifically reported. At present, twenty-five percent of this funding

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[10] This fund level assumes a
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will be paid by the federal universal service fund, and the remaining portion would be paid

from a state universal service fund created for that purpose. Pitkin Supplemental, Exhibit

BFP-10, p. 1).

     D.   <u>Criticisms of the Models</u>

     48   In the process of evaluating the BCPM and HAI proxy cost models, both models

have undergone close scrutiny and criticism. The issues debated between the parties include the

use of a proxy cost model for unbundled network element pricing, the openness of the models,

the reliance on preprocessing for key inputs, the appropriate loop length assumption, the correct

shape of the hypothetical lots, customer location methodologies, feeder route design, appropriate

input values, and overall reliability of the models. A summary of these criticisms and the model

sponsor's replies follows. In summarizing the criticisms we focus on those that appear most

important to the party making the criticism, and have not mentioned every allegation put forth by

any party. Many of the criticisms of the models address similar issues; therefore, we organize

this discussion by issue and not by model.

     49   AT&T's Ms. Natalie Baker criticized the BCPM 3.0 for being incapable to cost

unbundled network elements. Baker Rebuttal, p. 6. The FCC encouraged state commissions to

use ongoing proceedings to develop permanent unbundled network element prices as a basis for

its universal service cost study. The issue and relevancy of model consistency is addressed in

detail later in this order.

     50   AT&T's Pitkin claimed that BCPM models are not open for proper review and

comment. One of the FCC's ten cost model criteria requires:

> [The] cost study or model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment. All underlying data should be verifiable, engineering assumptions reasonable, and outputs plausible.[11]

51   Pitkin claimed that the BCPM did not meet this criteria for three reasons: (1) that documentation for BCPM is inadequate, (2) that default values used by the BCPM are not verifiable because of their proprietary nature, and (3) the state-specific values are also proprietary information, and therefore, unverifiable. Pitkin Rebuttal, pp. 4-6.

52   In response to Pitkin's criticism, U S WEST's Copeland asserted in both his direct and rebuttal testimony that BCPM is fully open to the public. The data sources are available through public records and the model is fully documented. The model and documentation are available on the U S WEST web-site for interested parties to run independently. Transcript, Vol. 2, p. 12. In addition, Copeland rebuts AT&T's claim that the HAI model is completely open and available to the public. U S WEST attempted to purchase geocoded data by which AT&T forms clusters. In response to the request, PNR & Associates wrote, "The specific data that you requested cannot be released because it is proprietary either to our data vendors or to AT&T and MCI." Copeland Rebuttal, Exhibit PBC-9. This is an example of where key functions of the HAI are proprietary.

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[11] See FCC Public Notice, "Criteria For State-Conducted Economic Cost Studies," CC Docket 96.45, DA 97-1501 (July 29, 1997).

53   AT&T's Pitkin also asserted that too many of the critical calculations in the

BCPM are external to the model. Pitkin Direct, p. 7. The Signaling Cost Proxy Module is

separate from the BCPM model, and many of its inputs are proprietary. Pitkin Rebuttal, p. 43.

In addition, the programs used to calculate customer location, formulate ultimate grids, and

design feeder routes are performed in preprocessing and are not easily modified.   Because all

costs are ultimately determined by the underlying grid design, Pitkin asserts that flaws in the

methodologies and the engineering assumptions of BCPM would result in grossly overestimated

costs. However, Mr. James Schaaf of U S WEST argued alternately that flaws in the

methodologies and the engineering assumptions of HAI could result in grossly underestimated

costs. Schaaf Rebuttal, p. iii. In making its decision, the Commission looked at each model's

preprocessing and internal methodologies and assumptions, as well as at each model's inputs in

large part to address these concerns.

54   Both parties testified regarding the appropriate loop length used for cost

estimations. Pitkin took issue with engineering assumptions in the BCPM that limited serving

area grids to areas less than 12,000 feet by 14,000 feet and that subdivided macro-grids if there

are more than 1,000 customers. He testified that larger areas could be more efficiently served.

He argued that these limitations create grids that are too small and tend to cause the BCPM to

overbuild plant and overstate costs. Pitkin Direct, pp. 8-9. Pitkin supported the HAI

engineering assumptions and asserts that a loop design of up to 18,000 feet is appropriate and

cost efficient.

55   In his rebuttal testimony, U S WEST's witness Schaaf testified that the long loop

design (18,000 feet) engineered by HAI, if actually built, results in difficult-to-hear, poor, noisy

phone service. His testimony referenced manufacturer user manuals for systems components and

AT&T's own Outside Plant Engineering Handbook both of which document this loss in service

quality. Schaaf Rebuttal, pp. 4-6. Schaaf adds that this unacceptably poor quality of service is

exasperated by HAI's over reliance on aerial plant. Aerial plant is more susceptible to weather,

and temperature changes decrease the quality of service to these long loops. Schaaf concluded

that these engineering assumptions in HAI do not meet quality standards associated with

universal service. Schaaf Rebuttal, p. 10.

56   Another key engineering assumption on which the parties disagree relates to the

assumed lot shape in the different models. AT&T's Pitkin testified that assuming lots are

rectangular with the short side along the street more closely matches reality. He noted that

developers minimize the costs of building roads, sidewalks, and driveways by creating

rectangular lots where the depth is greater than the width.   Pitkin Rebuttal, p. 53. U S WEST's

Schaaf refutes Pitkin's assumption that lots are rectangular. He explained that in reality, homes

are most likely to be placed on very different shaped lots. Schaaf also maintained that the

BCPM's square lot assumption is a better estimation because it averages the many different

shapes and sizes of lots and assumes that plant could come from any side of the lot. Hence,

Schaaf concluded that the HAI would underestimate drop lengths by assuming the shortest

distance possible, while the BCPM more accurately estimates average drop lengths. Schaaf

Rebuttal, p. 18.

57   The parties also disagreed on the method of estimating customer location.

AT&T's Pitkin testified that the BCPM fails to model actual customer locations. Instead, the

BCPM only estimates locations based on road mileage, line counts, and Census Block data.

While the BCPM does exclude uninhabited roads such as limited access highways and bridges, it

does not account for other road types in its assumptions. Transcript, Vol. 2 , p. 27. Pitkin further

asserted that the BCPM customer location methodology creates a false sense of precision and is

not much more accurate than the methods of determining customer location in earlier versions of

BCPM. Pitkin Rebuttal, pp. 29-30.

58   U S WEST's Copeland, in turn, took issue with the HAI's customer location

methodology. He disputed AT&T's claim that geocoding accurately locates customers. He

showed that in rural areas in Montana geocoding was not accurate—the HAI successfully

geocoded only about 8.5% of actual customer locations in three test counties U S WEST serves.

For those households that cannot be successfully geocoded, the HAI distributes households

uniformly along Census Block boundaries. Copeland's exhibits show how geocoding and

placing unknown households along Census Block boundaries inaccurately places households

when compared to actual satellite images. According to Copeland, the HAI gives a false sense of

accuracy. Copeland Rebuttal, pp. 3-4.

59   AT&T's Pitkin further noted that the BCPM's feeder route design overstates

costs. Because the BCPM directs feeder routes toward population clusters, average feeder route

distances are minimized. However, total route distances can actually be larger than when

horizontal or vertical feeder routes are used. Pitkin Rebuttal, p. 18-21. In rebuttal to this

criticism, Copeland pointed out that the BCPM is designed to determine the least cost alternative,

based on total feeder length in designing feeder routes.   Copeland Rebuttal, p. 30.

60   Pitkin also criticized BCPM 3.1's input values. He argued that the "state-specific"

values were flawed because they are proprietary and therefore unverifiable, and because they

represent embedded costs and not forward looking costs as required by the FCC. In addition,

Pitkin stated that the BCPM understates the amount of structure sharing that is possible. Pitkin

Rebuttal, pp. 18-21. U S WEST witnesses denied that input values are unverifiable. Copeland

admitted the cost inputs used for Montana reflect current U S WEST equipment contracts and

construction costs, but denied that these are embedded costs. Rather, he argued these costs

reflect the true costs U S WEST would incur if the network were built today using current

technology. Copeland testified that using these inputs actually shows that the BCPM for

Montana is forward looking. Copeland Rebuttal, p. 35.

61   U S WEST's Ms. Lori Lent testified that the HAI was designed to produce

predetermined results. The HAI produces very similar results despite major changes between its

current version and previous versions.

62   Lent testified that the HAI results were unreasonable based on a series of

sensitivity runs she had performed. She modified several key inputs in the HAI, including

structure sharing, non-switched access lines, drop investment, plant mix, and economic lives.

She concluded that reasonable changes in these and other key inputs result in a significantly

higher statewide average basic local service cost estimate. Lent Rebuttal, p. 50.

63   AT&T's Pitkin attributes the HAI's stable outputs to the model's overall

soundness. In his testimony, Pitkin claimed that the stable results show that the original

foundation of the model is solid. For this reason, stable model outcomes should increase

confidence in the model, not decrease it. Pitkin Direct, p. 11. Furthermore, many of the values

for key inputs Lent modified in her runs of the HAI are the same input values that are disputed

between the parties, and tend to be cost drivers in both models.

    E.   Model Selection Criteria

    64   There are several sources of criteria on which this Commission may base its

selection of a proxy cost model. The Commission is obligated to use the FCC's ten criteria. In

this regard, the Montana Commission considers the State Members' First and Second Reports on

the Use of Cost Proxy Models in its proxy cost model choice.[12] In addition, this Commission

chooses to exercise its right to recommend a forward looking economic cost model using

additional criteria.

    65   Attached to this order is a copy of the document required by the FCC for

evaluation of Montana's choice of a proxy cost model, as put forth in the FCC's February 27,

1998 Public Notice (DA98-217). *See* Attachment a. This document gives general and

supporting information regarding the Montana Commission's choice of a proxy cost model. In

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        [12] The State Members' Second Report on the Use of Cost Proxy Model, CC Docket No.
96-45, lists eight criteria a proper proxy cost model should incorporate. These criteria were
essentially adopted and expanded by the FCC for its criteria. Hutsell Direct, p. 27. Therefore, a
repeated discussion of these criteria is not necessary. The Joint Board also critiqued the BCPM
and the HAI in both the State Members' First and Second Reports on the Use of Cost Proxy
Models. They raised concerns regarding the engineering constraints of the models, terrain
assumptions, operating costs, input values, and benchmark levels. In making its decision, the
Commission is cognizant of these critiques.

addition, it demonstrates in detail how the Commission's choice fulfills the FCC's Criteria for

State-conducted Economic Cost Studies and other requirements of the Universal Service Order.

66   Further consideration of the model criteria mentioned here follows in the

discussion of the Commission's model choice.

III.   MODEL SELECTION

67   Although time limited the analysis of this Docket's cost modeling issues, the

Commission opted to recommend a proxy cost model to determine Montana's federal universal

service funding. The alternative choice was to defer to the FCC. The FCC, however, is not as

familiar with Montana's unique circumstances. It is not unprecedented to decide complex issues

in short time frames and with less than perfect information. The Arbitration Order in the U S

WEST and AT&T arbitration docket states that while the Commission finds both parties' studies

flawed, the short time frame and complexity of issues made it impossible to conduct a thorough

review of each of the studies. *See* In the Matter of the Petition of AT&T Pursuant to 47 U.S.C.

Section 252(b) for Arbitration of Rates and Conditions of Interconnection With U S WEST,

Docket No. D96.11.200, Order No. 5961b (Mar. 20, 1997). That situation and the Commission's

finding rings true in this Docket. The same sort of complexity need not preclude decisions in this

Docket. Therefore, we recommend a forward looking economic cost model to the FCC for

purposes of computing federal universal service funding for Montana.

68   In this section of the order we state our reasons for recommending the BCPM

model to the FCC for purposes of the federal universal service funding. Multiple reasons

underlie the Commission's decision. These reasons include technical, legal, and economic

rationale that supplement the FCC's criteria.[13]   In order, the Commission's reasons first involve

and address AT&T's analysis of U S WEST's need for universal service funding. This first part

includes a discussion of the accuracy of AT&T's cost model. Next, we address the accessibility

of the models, including sponsor support and the proprietary and transparency aspects of the

models.

69   Two additional reasons for choosing the BCPM are more complex and require

separate and expanded discussions. One reason entails sizing, sourcing and distributing universal

service funds.   The second such reason involves the parties' arguments for consistent costing.

Their arguments intertwine their consistency arguments with allegations of arbitrage and cross

subsidies, all addressed below.

A.   <u>Montana's High Cost Areas and Need For Universal Service Funds</u>

70   Montana stands apart from most other states in terms of its land and population

characteristics. Montana is one of the nation's least densely populated states. This fact places

Montanans at risk of not enjoying the basic telephone services that urban consumers may take for

granted.

71   The 1996 Act envisions a dynamic definition of basic service and consumers

likely would agree. The FCC recognized that what was once a luxury (e.g., touch tone) is now

basic service. Congress required the FCC to define basic service for purposes of computing

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[13] *See* Public Notice of February 27, 1998.

forward looking economic costs; it did so in its <u>Universal Service Order</u>.   From the perspective

of the Montana Commission and many Montana consumers, the definition is circumstantial as

well as dynamic. Services like PCS and broadband internet are not taken for granted, are

unavailable in some areas of Montana, and may in fact be critical to rural Montanans' access to

medical and other essential services. Toll service also may be a lifeline to essential services in

many areas of our state.   From the perspective of rural Montanans, basic service may include

services not considered basic in states more urbanized than Montana. Therefore, to achieve the

Congress's and the Montana Legislature's universal service goals, the model which computes

universal service costs for Montana's high cost areas should be as accurate as the parties'

hypothetical cost models permit.

72   In her rebuttal, AT&T's Ms. Natalie Baker compared aggregate revenues and

costs and then concluded that U S WEST needs no universal service subsidy. Baker Rebuttal, p.

5. If costs vary inversely with population density, and if federal universal service funding is not

needed in Montana as AT&T asserts, the Commission questions how any other state's non-rural

carriers could need universal service funding. The U. S. Congress did not commit itself and

tremendous FCC and state commission resources to develop universal service funding policies if

there is no need for any universal service funding, even for U S WEST in Montana which

consistently ranks high among those states with highest costs.

73   Because the cost model for which the FCC seeks our recommendations is for non-

rural carriers, this order applies only to U S WEST in Montana.[14] Although U S WEST is a non-

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[14] In the May 8, 1997 <u>Universal Service Order</u> at ¶¶ 206-211, the FCCit discusses the
distinction between rural and non-rural carriers.

rural carrier covering a 14-state region, its entire Montana Service territory differs from that in other states within the region. Although AT&T's analysis concludes U S WEST needs no universal service funding in Montana, a recent Telecommunications Industries Analysis Project paper reveals just how Montana differs from other states (see TIAP's March 10, 1998 paper titled "Payers and Receivers: Various Proposals for the High Cost Fund"). We doubt U S WEST's entire service territory in Montana has population density characteristics like most other states which would support AT&T's conclusion that U S WEST needs no universal service funding in Montana. Therefore, it is reasonable to conclude that U S WEST's Montana territory includes high cost areas which should be supported by universal service funding.

74   In addition, many of the services contained in AT&T's aggregate revenue and cost analysis, and for which AT&T reasons that U S WEST needs no subsidy, are not candidates for federal universal service funding. Universal service support targets basic voice grade access to the public switched network for single-party service and includes Dual Tone Multifrequency signaling (TouchTone), E911 access and, operator, directory and interexchange service access. Universal Service Order, at ¶ 56. Thus, Baker's universal service subsidy conclusion, if not her reasoning, appears at odds with the 1996 Act and FCC policies. Her conclusion also fails this Commission's test of reasonableness.

75   U S WEST's Mr. Brigham testified that AT&T's comparison of aggregate revenues and costs, and in turn AT&T's conclusion that U S WEST needs no universal service subsidy, undermine the basic purpose of universal service funding. We conclude that there is something amiss in AT&T's reasoning that becomes more evident as we look at AT&T's technical analysis and the accuracy of its geocoding.

76   U S WEST questions the results of AT&T's cost modeling. U S WEST's Ms.

Lori Lent analyzed the trend in AT&T's Hatfield modeling to show consistent resulting costs

with each change in the model. Lent Rebuttal, p. 9. Despite significant changes in input values,

AT&T's model consistently arrived at a similar low cost result. We conclude that Lent's

testimony appears reasonable from the evidence available to the Commission in this Docket.

77   In his rebuttal, U S WEST's Mr. Copeland provided evidence of the inability of

AT&T's model to locate customers. Copeland's testimony compared AT&T's effort at geo-

coding household locations with actual satellite locations. Copeland Rebuttal, Exh. Nos. 4-6.

Based on this comparison, AT&T's HAI model does not appear to capture Montana's unique

demographic characteristics.[15] The evidence was undisputed; geocoding did not locate U S

WEST's Montana rural population with much accuracy.

B.   Model Support, Proprietary Aspects, and Accessibility

78   There are three parts to the Commission's findings regarding the accessibility of

the models and model inputs that involve model support, proprietary material and transparency.

First, AT&T's decision to withdraw its chief modeling witness's testimony is a Commission

concern because it made it difficult to analyze the HAI in this Docket.

79   Second, both AT&T and U S WEST alleged that the other's model or inputs are

proprietary.   AT&T criticized the inaccessibility of all aspects of the BCPM's modeling and

inputs. AT&T did not rebut U S WEST's **rebuttal testimony asserting the AT&T model's**

preprocessing was not divulged. Copeland Rebuttal, p. 24. U S WEST's model also

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[15] As U S WEST's Mr. Brigham states in his rebuttal testimony, either sponsor's proxy
cost model develops theoretic customer locations.

suffers, but AT&T's criticism that the BCPM contains proprietary material is simply not a criticism unique to the BCPM.

80   Third, AT&T criticizes the BCPM for not being accessible. With one qualification, the Commission finds both models similarly comprehensible or, as the case may be, incomprehensible. Whereas U S WEST subjected its model to the rigor of cross examination, AT&T did not. AT&T's decision to withdraw a key witness insulated the HAI model from critical cross examination in this Docket; AT&T foreclosed others from exploring the HAI model's deficiencies.

81   Complexity also affects a model's accessibility. Proxy cost models are both hypothetical and theoretical as U S WEST's Mr. Brigham stated. Neither the BCPM nor the HAI is unique in this regard. Due to their hypothetical and theoretical characteristics, proxy cost models differ from the incremental cost models used to establish retail prices.   Cost of service models for retail service should reflect actual avoidable and incremental costs. Retail prices ration services subject to a revenue requirement constraint.   Retail prices should seek to achieve an efficient outcome but should achieve a balance as suggested by Bonbright's principles. In contrast, forward looking economic costs for universal service support purposes are not subject to the same principles and constraints.

C.   Funding: Size, Source and Distribution

82   In their respective testimony or briefs, AT&T and U S WEST argude that the Commission should consider the universal service fund's size when deciding a forward looking

cost model for Montana. We address this testimony and find that the BCPM better achieves

Congress's and the Montana Legislature's universal service goals.[16]

83   In his direct testimony, AT&T's Mr. Fischer testified on the policy implications of

the federal high cost fund's size. This testimony involves the policy and the impacts of Montana

statutes as well as how the FCC's "affordability" benchmark impacts a fund's size. He also

related the fund's size to consumer welfare, which involves developments of competition;

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[16] Consistent with § 254 of the 1996 Act, the FCC lists as critical goals: (1) implementing all universal service objectives of the Act; (2) maintain affordable basic residential service rates; (3) ensure affordable basis service rates via explicit funding mechanisms and (4) bring the benefits of competition to as many consumers as possible. The Montana Legislature's goals declare that it remains the policy of the state of Montana to maintain universal availability of basic telecommunications service at affordable rates and, to the extent consistent with maintaining universal service, it is further the policy of the state to encourage competition. Section 69-3-802, MCA.

minimizing price distortions; just, reasonable and affordable basic exchange service prices; and

payment of the universal service "social program" bill.

84   Mr. Fischer expanded on these four consumer welfare dimensions. He asserted

that too large a high cost fund subsidizes ILECs at the very time when markets that are opening

should not be threatened by anti-competitive conditions. Therefore, both explicit over-

subsidization and implicit subsidies will accrue to the incumbents and stifle the development of

competition in Montana. Second, too large a fund will distort prices for all telecommunication

services and, in turn, burden end users and distort service subscriptions. Third, too large a fund

assumes that just, reasonable and affordable rates will not occur. Finally, to avoid double

collection of subsidies, Fischer testified that the universal service fund should be no larger than

necessary. He adds that customers are entitled to know the source and use of universal service

funds.

85   In her rebuttal, AT&T's Ms. Natalie Baker analyzed whether U S WEST needs

any universal service subsidy today given that its revenues exceed its costs. Her analysis

compares aggregate revenues and costs for U S WEST's entire market. Even after correcting her

initially erred estimate of U S WEST's universal service fund request, she found U S WEST's

universal service subsidy request to be about $120 million per year. Baker Surrebuttal, pp. 2-3.[17]

 Based on the Montana statute's "pursuant to a determination of need" criterion, she concludes

that U S WEST does not need a universal service subsidy.[18]

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[17] U S WEST asserts the $120 to $130 million range includes the 25 percent interstate
fund and benchmarks in the range of 120 to 130 percent of cost. Transcript, Vol. 1, p. 174.

[18] The Montana Telecommunications Act reads, in relevant part, that pursuant to a

86   AT&T's also argues that this Commission should not ignore the fund's size when

selecting a model. AT&T Reply Brief, p. 8. AT&T adds that it is entirely reasonable to look at

the results of a given model and the effect it may have on the size of any state fund.

87   U S WEST cited Montana law in its Opening Brief, stating that because Montana

has a large number of high cost customers, it has a strong interest in ensuring that it receives its

just share of federal government support. U S WEST Opening Brief, at 4. U S WEST adds that

the selected model directly affects federal support and that accurate costing is to Montana's

advantage.

88   While the size of any federal universal service fund may be a chief concern of U S

WEST or AT&T, this Commission finds that the resulting size should not be the goal. The

resulting fund should be a by-product of critical analysis as it is in this docket.

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determination of need, the Commission shall establish and administer a fund to assist eligible
telecommunications carriers in providing affordable telecommunications services in high cost
areas. Section 69-3-842, MCA.

89   Although this Commission has no influence over the federal benchmark, and

despite the fact this proceeding is not about a state universal service fund, both AT&T and U S

WEST urge the Commission to pick a benchmark.[19]   However, they disagree on the basis,

revenue, or cost of the benchmark. AT&T's Fischer favors a revenue benchmark for the state

universal service fund. Fischer Direct, p. 41. Without reference to a fund (federal or state), U S

WEST's Brigham favors a cost-based benchmark. Brigham Direct, p. ii.

90   While the Commission finds the testimony interesting, benchmark

recommendations are irrelevant to this proceeding. For the federal universal service fund, the

benchmark is simply outside of any state commission's jurisdiction. The federal benchmark is an

FCC policy decision. The issue of a benchmark for a state universal service fund may be

important, but any such discussion in this Docket is premature. That issue should be debated in a

docket focused on the state, not the federal, universal service fund. The Commission will

consider the issue of a state affordability benchmark when addressing the state universal service

fund.   As we next discuss, however, the source and use of the federal universal service funds is

another source of uncertainty.

91   AT&T and U S WEST both testified on the source and use (distribution) of any

federal universal service fund. AT&T's Fischer asserted that to avoid an unwieldy social

program, universal service should be funded in an economically efficient manner--meaning the

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[19] The FCC agreed with the Joint Board's recommendation and, in turn, intends to
establish a nationwide benchmark based on average revenues per line for local, discretionary,
interstate and intrastate access services, and other telecommunications revenues that will be used
with either a cost model or a cost study to determine support that carriers receive for lines in a
particular geographic area.

Montana Commission needs to fully understand the explicit source and use of funds. Fischer

Direct, p. 35. The 1996 Act requires that all telecommunications providers contribute to

universal service. Fischer testifies that an efficient subsidy is narrowly targeted. Fischer Direct,

p. 36.

92   As for the state fund, Mr. Hayhurst testified that U S WEST would offset any

universal service funds with price decreases. In the alternative, he noted how construction costs

in high cost areas could be offset directly.[20]   Hayhurst Rebuttal, p. 5; and Transcript, Vol. 1, pp.

122-125. In contrast to Mr. Hayhurst, U S WEST's Mr. Brigham testified that universal service

support should be targeted to basic service in high cost areas. Because of Hayhurst's focus on a

state universal service fund, and because of the disparity of policy proposals, U S WEST was

asked to explain how it plans to distribute federal universal service funds:

> [Ms. Hammel]: How would US West offset any draw from a federal universal
>   service fund?
> [Mr. Hayhurst]: I suspect that that would be a reduction in interstate access charges.

Transcript, Vol. 1, p. 131.

93   This cross examination did not clarify the above disparate U S WEST testimony

on how federal universal service fund would be distributed.   We simply do not know at this time

how U S WEST will distribute any resulting federal universal service fund.   We do have U S

WEST's assurance that it will not receive a windfall and that it will reduce prices that provide

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[20] A March 20, 1997 U S WEST communication to the Commission contains a
March 13, 1997 analysis performed by Alfred Kahn and Timothy Tardiff titled "Funding and
Distributing the Universal Service Subsidy." This statement by Kahn and Tardiff, containing a
similar proposal to Mr. Hayhurst's, was available to AT&T (Transcript, Vol. 1, p. 57).

implicit subsidies. Brigham Rebuttal, p. 29. In any case, the choice is not likely one this

Commission decides.

        D.   <u>Costing Consistency, Arbitrage and Cross Subsidies</u>

        94   AT&T and U S WEST both testified on the need to apply costing models

consistently to different purposes. The absence of cost consistency raises allegations of arbitrage

and cross subsidization. We review the kinds of consistency, the arbitrage implications and,

finally, the cross subsidy allegations.

        95   There are three costing purposes raised by AT&T's and U S WEST's testimony.

They include: (1) proxy cost modeling for universal service funding, (2) total element long-run

economic cost (TELRIC) modeling for wholesale pricing, and (3) incremental cost modeling for

retail service pricing. For each purpose there may be two or more competing cost tools such as

AT&T's HAI model and U S WEST's BCPM for proxy cost modeling.

        96   The FCC is the source of AT&T's and U S WEST's testimony on the need for

consistent cost modeling:

> We also <u>encourage</u> a state, to the extent possible and consistent with the above
> criteria, to use its ongoing proceedings to develop permanent unbundled network
> element prices as a basis for its universal service cost study. This would reduce
> duplication and <u>diminish arbitrage opportunities</u> that might arise. We urge states
> to coordinate the development of cost studies for the pricing of unbundled network
> elements and the determination of universal service support.

Fischer Direct, p. 12 (emphasis added).

        97   As U S WEST and AT&T stated, the FCC's <u>Universal Service Order</u> encouraged

the states to use one cost model for universal service costing and wholesale pricing purposes.

Brigham Direct, p. 5, Fischer Direct, p. 12.

98   In this docket, AT&T and U S WEST disagreed on what cost modeling tools should be applied consistently to the three above listed purposes. Because they disagreed on the kind of consistency, they also disagreed on the arbitrage consequences and cross subsidy implications of inconsistent cost modeling. AT&T and U S WEST alleged different arbitrage consequences result from inconsistently applying costing to the three applications. We review AT&T's and U S WEST's consistency and arbitrage testimony. Because their testimony is not limited to the need for consistency and the consequences of inconsistent costing, we then review and respond to their cross subsidy allegations.

99   To achieve "consistency of cost methodology," AT&T's Fischer testified that the Hatfield model uniquely satisfies the requirements and should be applied to the three cost purposes.[21] Fischer Direct, pp. 32, 39. To assure consistent use of cost models, the Commission must apply the same method to identify explicit universal service funding (§ 254(e) of the 1996 Act) as used with unbundled network elements and interconnection (§ 252(d)(1) of the 1996 Act).[22] Because the use of different cost methods (i.e., historic or embedded) drives a wedge between economic costs and incremental revenues, thereby distorting ILEC and CLEC investment and operation decisions, Fischer added that it is essential to use consistent cost estimates to establish the cost of ILEC facilities in both unbundled network element cost

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[21] Although Ms. Baker adopts Mr. Fischer's testimony we will refer to this testimony as Mr. Fischer's.

[22]   Fischer asserted that U S WEST uses statewide average pricing for local retail exchange rates and the underlying unbundled network elements offered to AT&T. He noted that unbundled network elements serve as the building blocks to provide local service -- the primary beneficiary of universal service support. He added that universal service fund costs are based on the same unbundled network elements used to provide local service (p.11).

proceedings and for universal service support.   AT&T's Baker testified that the need for

consistency stems from the fact that unbundled network elements are a major component of

services to be supported. Baker Rebuttal, p. 6.   Forward looking economic logic is the glue that

binds the need for cost consistency.

   100 As for AT&T's arbitrage concern, Mr. Fischer testified that "universal service

subsidies must be <u>economically efficient</u> and <u>competitively neutral</u>." Fischer Direct, p. 5.

Competitive neutrality is an FCC principle. Because CLECs must purchase unbundled network

elements and interconnection services from ILECs to compete, Fischer testified that it is essential

to estimate ILEC facility costs consistently for unbundled network elements and universal service

purposes. Fischer Direct, p. 6. In situations where a CLEC offers service solely through

purchased ILEC unbundled network elements, the CLEC's support gets capped at the unbundled

network element prices it pays. The ILEC, however, can obtain universal service fund support

based on deaveraged universal service fund costs that typically exceed average costs. Given

today's interim unbundled network element rates, ILECs may receive universal service funds

denied new entrants.

   101 AT&T's Fischer also noted that the FCC recognized "pitfalls that could occur"

when universal service support is determined at a lower level of aggregation than unbundled

network element costs. Fischer Direct, p. 12. In sharp contrast to arbitrage pitfalls that <u>could</u>

occur, Fischer asserted that the current and excessive access charges <u>are</u> "profoundly

anticompetitive." Fischer Direct, p. 19. To solve the arbitrage problem, however, Fischer

recommended deaveraging both retail prices and unbundled network element costs to the level of

universal service fund support required by Montana law.[23]   Fischer Direct, p. 13.

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[23] AT&T's Ms. Baker later testified that retail rates need not be deaveraged. Transcript, Vol. 1, p. 22.

102   U S WEST's Mr. Brigham testified that despite the FCC's encouragement to the

contrary, a different cost model should be used to estimate universal service costs than is used for

wholesale and retail pricing costs. Brigham Direct, pp. 4-5. Wholesale and retail prices ought to

derive from the same model, however. He testified that universal service proxy cost studies

should reflect generic, nationwide average standards and technologies. He asserted the

Commission should base wholesale and retail prices on forward looking incremental cost models

considering U S WEST's specific engineering designs, standards, technology and equipment.[24]

Brigham disputed AT&T's testimony that the Hatfield model is applicable to the three costing

purposes and doubted the need to estimate costs in the consistent manner that AT&T proposes.

103   In rebuttal, U S WEST's Mr. Brigham raised an arbitrage concern and then

disputed AT&T's arbitrage testimony.   First, he asserted consistent wholesale unbundled

network element and retail service costing is needed to avoid an arbitrage opportunity.

Specifically, unbundled loop network element costs should be developed using the same loop

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[24] Although U S WEST's Brigham argues to use separate proxy cost and unbundled
network element cost models, but consistent unbundled network element and retail cost models,
his rebuttal holds that even if a proxy cost model produces all unbundled network element costs,
there still must be another model for retail services. This testimony of Brigham's appears
actually to contradict his other arguments for consistency between retail and wholesale pricing.
This testimony, however, is not in any way supportive of AT&T's testimony on the need for cost
consistency.

investment model used with retail service loop costs; otherwise, inconsistent wholesale and retail

prices place U S WEST at a retail pricing disadvantage.

104   Mr. Brigham also rebuts AT&T's arbitrage testimony. Whereas AT&T's

arbitrage concern paints a picture of how CLEC's are disadvantaged, Brigham asserted that

AT&T misunderstood the underlying FCC concern and argument. Brigham maintained that the

FCC was concerned that ILECs not be disadvantaged. Brigham added that AT&T failed to

provide material evidence of how its arbitrage example occurs.   Although modifying AT&T's

initial allegation to assert arbitrage is an opportunity for both parties, Baker attempted to clarify

for U S WEST that AT&T's arbitrage concern is a consequence of differing levels of aggregation

and not differing models. Transcript, Vol. 1, pp. 30-31, and 55.

105   To restate, AT&T argues that the HAI model ought to resolve three costing

purposes: (1) universal service proxy cost modeling, (2) wholesale pricing, and (3) retail pricing.

 In contrast, U S WEST disputes AT&T's assertion and holds cost consistency need only exist

between wholesale and retail prices.

106   The Commission finds both AT&T's and U S WEST's arguments for consistency

appear, in part, strategically driven. As with the parties' testimony, our findings are multi-

faceted.   We do not find cost consistency to be a binding constraint that forces the selection of a

proxy cost model over and above other considerations. We explain our doubts with the arbitrage

allegations, and we find the cross subsidy allegations add more heat than light to the confusion

that surrounds them.

107   First, even if AT&T were correct that universal service funding and wholesale

pricing must be consistently based, given the outcome of the AT&T and U S WEST arbitration

and the improvements to AT&T's sponsored model since 1996, costs will differ and cannot be

made consistent such that universal service and wholesale prices are similarly cost based. That

is, even if the HAI model was adopted in this Docket, it is unlikely the HAI model's outputs

could be hammered into consistency with the results of the AT&T and U S WEST arbitration

docket's outcomes. The two dockets are "out of sync." If other negotiated agreements permit

prices that differ from those that result from the AT&T and U S WEST arbitration, wholesale

prices are not uniform among U S WEST and all other CLECs.

108   More importantly, the cost models for universal service funding and wholesale

pricing have different purposes. The constraints imposed on the resulting costs, as U S WEST

has noted, prohibit consistency. Wholesale prices are not deaveraged to the level of detail that

universal service costing is disaggregated. It is unlikely that the level of high cost area detail

found in proxy cost models will ever exist in retail rates. Even AT&T concedes not to seek

deaveraged retail rates. Transcript, Vol. 1, p. 22.

109   Second, different goals and objectives underlie the choice of costing methods for

universal service, unbundled network elements, and retail prices. Retail prices are set to achieve

certain objectives including, but not limited to, a binding revenue requirement constraint.

Another objective is to minimize price distorting consumption of retail services. For example, a

drop line has no place in an economic cost study for existing customers' basic exchange service.

Drop line costs are sunk in a study of avoidable economic costs. Drop line costs, however, must

be included in forward looking economic cost models for universal service funding costs.

110   There simply are different objectives and constraints involved in applying costing

to universal service, and to unbundled network element prices and retail pricing. The twain

should not meet. Just because proxy cost models must include hypothetical modeling

assumptions, the rest of the costing should not have to conform.[25] While the FCC requires

hypothetical cost modeling assumptions for universal service funding, the same assumptions are

not necessarily relevant or required for efficient retail pricing purposes.

111   Third, AT&T's arbitrage concern arises when the universal service cost exceeds

an unbundled network element price. Based on AT&T's reasoning, CLECs are discriminated

against vis-a-vis an ILEC. If one explores this concern, the outcome of the allegation is unclear.

U S WEST's cross examination of AT&T's Ms. Baker made abundantly clear that the FCC fully

contemplated and foreclosed the opportunity for CLECs to engage in arbitrage. Transcript, Vol.

1, p. 30.

112   If U S WEST receives a new and higher level of federal universal service funding,

this Commission expects the changed amount would be offset by changes in other rates. For

example, if universal service funding in the amount of a $25 million increase flows to U S

WEST which then reduces contributions from carrier access charges and other rates by an equal

amount, would IXCs and CLECs not benefit? Given AT&T's comment that the current access

charges are excessive and "profoundly anticompetitive," we expect AT&T would flow through

any access charge reductions. Fischer Direct, p. 19.

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[25] One of the vacated portions of the FCC's Interconnection Order, In the Matter of
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996,
First Report and Order, FCC 96-325 (released Aug. 8, 1996), required the prices that new
entrants pay for interconnection and unbundled network elements to be based on what the FCC
labeled Total Element Long Run Incremental Cost, plus a reasonable share of forward-looking
joint and common costs.   Total Element Long Run Incremental Costs should: (1) assume wire
centers are placed at the ILEC's current wire center locations; (2) employ the most efficient
technology in determining the cost to reconstruct the local network.

113   Fourth, cross subsidy allegations pervade AT&T's and U S WEST's testimony

arguing for cost consistency. When nothing else seems constant, the polarized views of AT&T

and U S WEST on the existence of cross subsidies appear frozen in time.

114   AT&T's Fischer asserted, "Much of what has been alleged to be needed through

subsidies may be unnecessary, because existing retail local service revenues may already recover

efficiently incurred costs." Fischer Direct, p. 19. He also testified that this docket must be used

to eliminate implicit subsidies, that the Commission should initiate a state universal service fund

via a rulemaking and that the Commission should postpone the on-going rate rebalancing docket,

No. D96.12.220.[26]   Fischer Direct, p. 20, 41.

115   AT&T's Baker also analyzed whether residential service is subsidized. She found

U S WEST's statewide average residential revenues to exceed U S WEST's statewide average

residential costs. Baker Rebuttal, p. 14. In her terms, customers essentially subsidize themselves

under the current pricing system.

116   The polar view is U S WEST's. Mr. Brigham's cross subsidy testimony addresses

the existence of a residential subsidy and rebuts AT&T's testimony. Brigham alleged that

residential service is cross subsidized. Brigham Direct, Exec. Summary, and p. 10. In his

rebuttal, Brigham corrected AT&T's estimate of the universal service subsidy U S WEST would

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[26] The implicit subsidies AT&T lists include those due to: (1) geographic averaging; (2) the business/residence price difference; and (3) access charges (Fischer Direct, p. 33).

receive. Although illustrative to rebut AT&T's $208 million dollar subsidy estimate, Brigham

testified that the subsidy ranges between $120 and $130 million per year.

117   The allegations of cross subsidies are not substantiated by testimony in this

docket. Cross subsidy allegations, based on a comparison of the BCPM's or the HAI model's

costs to existing retail rates, are erroneous. Retail service prices need not, and should not, be

based on hypothetical (e.g, scorched node) modeling assumptions that the FCC uses with

TELRIC and proxy cost models. Cross subsidies may be determined after a comparison of

relevant costs and prices in a retail rate case. The last such comparison for U S WEST occurred

in 1992 in Docket No. 90.12.86 (Order Nos. 5535g and 5535h).[27]

118   AT&T's recommendation to postpone the rate rebalancing docket and to make

this universal service proxy cost docket a rate rebalancing docket is ill advised. This docket

never was, nor can it be, a rate rebalancing docket. This docket strictly focuses on what

hypothetical cost model this Commission should recommend to the FCC to use for federal

universal service funding purposes.

119   Consistency issues are not limited to those raised by AT&T and U S WEST.

Aside from the above concerns, this Commission questions whether a consistent estimate of

universal service funding costs is achievable. The Commission believes the FCC will be

challenged in its efforts to achieve cost consistency and may simply have to settle for second best

cost estimates. At least two and possibly more differing cost studies will be recommended by

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[27]   Not only does U S WEST not base any of its cross subsidy arguments on valid cost
studies, U S WEST goes so far as to compute two different estimates of lost contributions using
two different cost models, neither of which should be used to estimate cross subsidies. *See*
Brigham Direct, p. 12.

states to the FCC. Thus, a single model will not likely be used to compute every state's forward

looking economic costs. It is not clear to this Commission that all states that recommend cost

studies will submit studies that use the same year's dollars. Although an AT&T witness asserts

U S WEST's and AT&T's costs are in January 1, 1998 dollars, it does not follow that all forward

looking costs are, or will be, in the same year's dollars.

120   In summary, the Montana Commission recommends the BCPM 3.1 to the FCC for

its federal universal service fund program. We acknowledge the FCC's agreement with the Joint

Board that forward looking cost modeling is the best means to determine universal service

support in a manner that creates incentives for carriers to operate efficiently but does not give

carriers any incentive to inflate their costs.   If and when a state universal service fund exists in

Montana, the Commission finds that the BCPM model, in its then current evolutionary state,

should be considered to estimate forward looking economic costs for high cost areas.   Having

recommended the BCPM, the Commission now turns to its decisions on the BCPM input values.

IV.   MODEL INPUTS

121   Hundreds of user-defined inputs are used in the models to arrive at the cost. The

Commission considered changes to user-defined inputs for the cost of capital and structural

sharing percentages for aerial, buried and underground cable.

A.   Cost of Capital

122   U S WEST's default for the cost of capital in the BCPM is as follows:

	Percentage	Cost	Rate of Return
Long-term Debt	28.00 %	7.53 %	2.11 %
Common Equity	72.00 %	12.85 %	9.25 %

Total   100.00 %   11.36 %

AT&T's default for the cost of capital in the HAI is as follows:

	Percentage	Cost	Rate of Return
Long-term Debt	45.00 %	7.70 %	3.465 %
Common Equity	55.00 %	11.90 %	6.545 %
Total	100.00 %		10.010 %

123   U S WEST stated that to determine the capital structure for the BCPM the company weighted the marginal costs of debt and equity using the company's market value capital structure rather than using a capital structure based on the company's regulatory book value capital structure.   The cost of new debt was calculated by taking an average mix of long term and intermediate term debt from U S WEST Capital Market Group estimates, published in its *Capital Markets Outlook*.   The cost of capital was determined by taking the mid-point of the range of Discounted Cash Flow (DCF) and Capital Asset Pricing Models (CAMP) to U S WEST's trade stock, a group of telephone companies, and a group of comparable risk companies. The cost of equity estimates were checked for reasonableness against an estimate of investors' expected return on the stock market as a whole and against an equity risk premium estimate for U S WEST.

124   AT&T provided no analysis on the cost of capital in the testimony from Brian Pitkin. The FCC has established criteria that must be met by a cost proxy model. The FCC requires that the cost of capital should be either the authorized federal rate of return on interstate service, currently 11.25 percent, or the state-prescribed rate of return for intrastate service.

125   Currently U S WEST regulatory capital structure and costs are as follows:

	Percentage	Cost	Rate of Return
Long-term Debt	50.00 %[28]	8.88 %[29]	4.44 %
Common Equity	50.00 %	12.00 %[30]	6.00 %
Total	100.00 %		10.44 %

126.   In Docket No. 96.11.200, Order 5961b, the Hatfield default values were used, to

provide consistency with the previous order. The Commission adopts the Hatfield default values

to be used for the cost of capital in this Docket.

B.   Structural Sharing Percentages

127.   Structural sharing refers to the ability of a telephone company to share placement

costs of its cable facilities with other utility companies. Structural sharing can occur when a

telephone company places aerial cable, buried cable (trenching) and underground cable (conduit).

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[28]Capital structure approved in Docket No. 86.11.62, Order 5279a.

[29]Cost of debt approved in Docket No. 86.11.62, Order 5279a.

[30]Cost of common equity approved in Docket No. 88.12.55, Order 5398a.

128.   U S WEST's witness Mark Schmidt stated that the BCPM assumes that sharing of cable facilities will occur at the following percentages: aerial cable 50 percent, buried cable 20 percent, and underground cable 20 percent.

129.   AT&T witness Dean Fassett did not provide the specific sharing default inputs included in the HAI. Mr. Fassett indicated that for aerial cable the model assumes that 25 percent or less of the costs of a pole are assigned to the telecommunications provider. For buried and underground cable, he provides only a general discussion of the possible sharing of cable facilities and no default inputs.

130.   Generally the Commission adopts sharing percentages that represent a compromise between the two parties' positions. In Docket No. 96.11.200, Order 5961b provided a 33 percent sharing for aerial installation for feeder and distribution facilities. It also provided a 66 percent sharing assumption for both buried and underground feeder and distribution facilities. Due to the structure of both models, sharing assumptions are broken down into multiple density zones. The Commission concludes that it is reasonable to calculate the sharing percentages for feeder and distribution by taking the average of the BCPM and the HAI default inputs for each density zone.

131.   For the remaining user-defined inputs the Commission adopts BCPM default inputs to determine the cost.

V.   CONCLUSIONS OF LAW

1.   The Commission has authority to supervise, regulate and control public utilities. Section 69-3-102, MCA. U S WEST is a non-rural public utility offering regulated telecommunications services in the State of Montana. Section 69-3-101, MCA.

2.   The Commission has authority to do all things necessary and convenient in the

exercise of the powers granted to it by the Montana Legislature and to regulate the mode and

manner of all investigations and hearings of public utilities and other parties before it.

Section 69-3-103, MCA.

3.   The United States Congress enacted the Telecommunications Act of 1996 to

encourage competition in the telecommunications industry. Congress gave responsibility for

much of the implementation of the 1996 Act to the states, to be handled by the state agency with

regulatory control over telecommunications carriers. *See generally*, Telecommunications Act of

1996, Pub. L. No. 104-104, 110 Stat. 56 (*amending scattered sections of the* Communications

Act of 1934, 47 U.S.C. §§ 151, *et seq.*). The Montana Public Service Commission is the state

agency in Montana charged with regulating telecommunications carriers in Montana and properly

exercises jurisdiction in this Docket pursuant to Title 69, Chapter 3, MCA.

4.   Adequate public notice and an opportunity to be heard has been provided to all

interested parties in this Docket, as required by the Montana Administrative Procedure Act,

Title 2, Chapter 4, MCA.

5.   The Commission has the authority to adopt a cost model for Montana for federal

universal service funding. Where the Commission has regulatory jurisdiction, it must apply

federal law as well as state law, and where Congress has preempted state law, the Federal law

prevails. *See* FERC v. Mississippi, 102 S.Ct. 2126 (1982).

6.   Congress gave the FCC authority to implement § 254 of the 1996 Act. The FCC

has permitted states to choose a cost model for their respective state, but the FCC has the

ultimate authority whether to accept a cost model presented by a state commission. The Montana

Commission properly submits this Order to the FCC for purposes of federal universal service

support, with the following three attachments as required by the FCC's Public Notice in CC

Docket Nos. 96-45 and 97-160, DA98-217 (Feb. 27, 1998): (1) Attachment a (the text

document), (2) Attachment b (inputs for Montana), and (3) Attachment c (outputs for Montana).

VI.   ORDER

THEREFORE, based upon the foregoing, it is ORDERED that the BCPM Model 3.1 will

be used for determining federal universal service support for Montana, subject to the approval of

the FCC.

DONE AND DATED this 21st day of May, 1997, by a vote of 5-0.

BY ORDER OF THE MONTANA PUBLIC SERVICE COMMISSION

_____
DAVE FISHER, Chairman

_____
NANCY MCCAFFREE, Vice Chair

_____
BOB ANDERSON, Commissioner

_____
DANNY OBERG, Commissioner

_____
BOB ROWE, Commissioner

ATTEST:

Kathlene M. Anderson
Commission Secretary

(SEAL)

NOTE: Any interested party may request the Commission to reconsider this decision. A motion
      to reconsider must be filed within ten (10) days. See ARM 38.2.4806.

VII.   ATTACHMENTS